Bivalve immunity and response to infections: Are we looking at the right place?

Bassem Allam * and Emmanuelle Pales Espinosa

School of Marine and Atmospheric Sciences, Stony Brook University, Stony Brook, NY 11794-5000 Phone: 1 631 632 8745, Fax: 1 631 632 8915 Email: Bassem.Allam@stonybrook.edu

Abstract

Significant progress has been made in the understanding of cellular and molecular mediators of immunity in invertebrates in general and bivalve mollusks in particular. Despite this information, there is a lack of understanding of factors affecting animal resistance and specific responses to infections. This in part results from limited consideration of the spatial (and to some extent temporal) heterogeneity of immune responses and very limited information on host-pathogen (and microbes in general) interactions at initial encounter/colonization sites. Of great concern is the fact that most studies on molluscan immunity focus on the circulating hemocytes and the humoral defense factors in the plasma while most relevant host-microbe interactions occur at mucosal interfaces. This paper summarizes information available on the contrasting value of information available on focal and systemic immune responses in infected bivalves, and highlights the role of mucosal immune factors. Available information underlines the diversity of immune effectors at molluscan mucosal interfaces and highlights the tailored immune response to pathogen stimuli. This context raises fascinating basic research questions around host-microbe crosstalk and feedback controls of these interactions and may lead to novel disease mitigation strategies and improve the assessment of resistant crops or the screening of probiotic candidates.